

Water and Sediment Control Basin (No.)

Definition

An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.

Scope

This standard applies to planning, designing, and constructing water and sediment control basins. It does not apply to diversions (362), grade stabilization structures (410), or sediment basins (350).

Purpose

To improve farmability of sloping land, reduce water course and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.

Conditions where practice applies

This practice applies to sites where:

1. The topography is generally irregular.
2. Watercourse and gully erosion are a problem.
3. Sheet and rill erosion are controlled by other conservation practices.
4. Runoff and sediment damage land and improvements.
5. Soil and site conditions are suitable.
6. Adequate outlets are available or can be provided.

Planning Considerations

Water Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, and evaporation.
2. Ability to increase deep percolation below the root zone and, where possible, ground water recharge.

3. Potential for a change in rates of plant growth and transpiration because of changes in the amount of soil water storage.

4. Effects on the trapping or distribution of snow.

Water Quality

1. Potential to trap sediment and sediment-attached substances carried by runoff.
2. Potential changes in the flow of dissolved substances such as nitrates or pesticides into downstream water courses.
3. Potential movement of dissolved substances to ground water.
4. Effects on downstream water temperature.
5. Effects on the visual quality of downstream water resources.

Design criteria.

Water and sediment control basins can be part of the treatment needed to protect the soil resource base. In addition, practices such as terraces, contouring, a conservation cropping system, conservation tillage, and crop residue management shall also be used to control erosion.

Water and sediment control basins shall not be used in place of terraces. When a ridge and channel extend beyond the detention basin or level embankment, terraces shall be designed. The resource management system must reduce soil loss in the interval above and below the basin to prevent excessive maintenance and operation problems.

Spacing

Water and sediment control basins shall generally be spaced at terrace intervals. The grade of the watercourse between basins shall be considered, and the spacing shall be set to prevent watercourse or gully erosion. The drainage of each basin shall be limited so duration of flooding, infiltration, or seepage does not damage crops or create other problems.

The system of basins and row arrangement shall be parallel when possible and spaced to accommodate farm machinery widths. Consideration shall be given to embankment slope

lengths, top width, and inlet location when determining spacing.

Alignment

The embankment orientation and row direction shall be approximately perpendicular to the land slope to permit contouring as near as possible. The arrangement should permit farmability without excessive short point rows or sharp curves. Field boundaries and row length should also be considered when determining basin location and row direction.

Cross section

Embankment slopes shall not be steeper than two horizontal to one vertical. The effective top width and height shall be at least as wide as shown in the following:

Fill height (ft)	Effective top width (ft)
0—5	3
5—10	6
10—15	8

The constructed height of the embankment shall be at least 5 percent greater than the designed height to allow for settlement. The maximum settled height shall be 15 ft measured from the natural ground at the centerline of the embankment. Slopes may be vegetated or may be flattened to permit cropping.

Capacity

The basin shall be large enough to control the runoff during a 10-year, 24-hour-frequency storm without overtopping. The capacity of basins designed to provide flood protection or to function with other structures may be large and shall be adequate to control the runoff from a storm of a frequency consistent with the potential hazard. The basin also shall have the capacity to store the anticipated 10-year sediment accumulation, unless provisions are made for periodic sediment removal from the basin to maintain the design capacity.

The basins shall have the ends closed to the elevation needed for the design capacity. A maximum of 0.31 m (1 ft) of freeboard may be added to the design height to provide for an emergency spillway around one or both ends of the basin. The emergency spillway must not contribute

runoff to a lower basin in series that does not have an emergency spillway.

Outlets

Water and sediment control basins shall have underground outlets or soil infiltration outlets that meet the requirements for terraces (600) and underground outlets (620).

Vegetation

Slopes and distributed areas that are not to be farmed shall be established to suitable erosion-resistant vegetation. Environmental quality and quantity and wildlife food and habitat shall be considered in selecting the species of vegetation. If soil or climatic conditions preclude the use of vegetative cover and protection is needed, an organic or gravel mulch may be used. Seedbed preparation, fertilizing, seeding, and mulching shall be in accordance with the technical guides.

Maintenance

A maintenance job sheet or maintenance plan shall be provided for each resource management system and practice. The maintenance plans for the water and sediment control basin shall include maintenance requirements for the embankment, design, capacity, vegetative cover, and the outlet. Maintenance should include inspection of inlets for clogging and embankment failure after each large storm. Failures should be corrected as soon as possible to prevent major damages.

The sediment and design capacity shall be maintained by cleaning the basin or by raising the embankment height. Excavated material spread on the cropland shall be placed to maintain fertility and enhance topography. Fill material for increasing the embankment height shall be obtained in a manner that enhances topography and maintains productivity of the cropland. The vegetation shall be maintained to prevent sheet and rill erosion or gully of the embankment. Trees and woody cover generally create problems on embankments and should be controlled.

Plans and specifications

Plans and specifications for installing water and sediment control basins shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.